PHYSICIAN PAYMENT REVIEW COMMISSION

MEDICARE VOLUME PERFORMANCE STANDARD RATE OF INCREASE FOR FISCAL YEAR 1991

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MEDICARE VOLUME PERFORMANCE STANDARD RATE OF INCREASE FOR FISCAL YEAR 1991

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PREFACE

This report was submitted to Congress in accordance with the Commission's responsibility under the Omnibus Budget Reconciliation Act of 1989 to comment on the recommendations of the Secretary of Health and Human Services and to submit its own recommendations on setting the Volume Performance Standard rate of increase for physician expenditures under Medicare Part B.

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CONTENTS

Background 1

Volume Performance Standard Recommendations for FY 1991 2

The Future of the VPS Process 5

Conclusion 6

Technical Appendix 8

Bibliography 26

Tables 29

TABLES

Tables

1	HHS VPS Rate of Increase Recommendation for FY 1991 (In Percent)	30
2	Part B Reimbursement Amounts Per Enrollee, Aged and Disabled	31
3	Growth in Allowed Charges Per Enrollee for Physician Services, Aged and Disabled	32
4	Comparison of Actual Part B Outlays With Predicted Part B Outlays Used for Calculation of the United States Per Capita Cost	33
5	Timing of VPS Rate of Increase and Fee Update Recommendations	34
6	Growth in Total Allowed Charges by Type of Service ($ Millions)	35
7	Growth in Allowed Charges, Prices, and Volume for Surgical and Nonsurgical Physician Services	36
8	Growth in Charges, Prices, and Volume for Groups of Procedures, 1986-1989	37
9	Growth in Surgical/Nonsurgical Allowed Charges by Place of Service, 1986-1988	38
10	Growth in Allowed Charges by Specialty, 1986-1988	39
11	Case Mix Change for Visit Codes, 1986 to 1988	40
12	Comparison of Blue Cross/Blue Shield and Medicare Allowed Charges, 1987	41
13	Prevalence of Inappropriate Hospital Admissions	42
14	Inappropriate Care for Selected Procedures	43
15	PRO Denial Rates by Procedure	44
16	PRO and SuperPRO Denial Rates by State, 1986-1988	45
17	Carrier Denial Rates for Reason of Medical Necessity, 1989	46
18	Simulating Effects of Higher PRO/ Carrier Denial Rates	48
19	Variations in Volume and Expenditure Per Capita Across States	49
20	Impact of New Technologies on Volume Growth, 1986 to 1988	50
21	Beneficiaries Over Age 75 as a Percent of Discharges for Major Surgery, 1985 to 1989	51

The Omnibus Budget Reconciliation Act of 1989 (OBRA89) calls for the Secretary of Health and Human Services to recommend, by April 15 of each year, a Medicare Volume Performance Standard (VPS) rate of increase for the coming fiscal year (FY). The Physician Payment Review Commission must comment on the Secretary's recommendation and make its own recommendation by May 15 of each year. Three standards are to be established: one for all physician services, one for surgical services, and one for nonsurgical services. For FY 1991, the Secretary recommended rates of increase of 9.9 percent for all physician services, and 8.7 percent and 10.5 percent for surgical and nonsurgical services, respectively. The Commission recommends rates of increase of 11.2 percent for all physician services, and 9.3 percent and 12.1 percent for surgical and nonsurgical services, respectively.

BACKGROUND

For at least a decade, the rapid growth of physician expenditures has placed increasing financial burdens on beneficiaries and has drawn on federal resources that might more appropriately be devoted to other public needs. Since 1980, Part B spending has increased more than four fold. Beneficiary premiums have more than tripled, compared to a rise in Social Security payments per beneficiary of less than 60 percent. Outlays have risen from 1.8 to 3.9 percent of the federal budget. If this growth continues, Part B expenditures will more than double every five years.

It is the Commission's judgment--shared by the Congress--that growth in physician expenditures must be slowed to a lower, sustainable rate. The Commission proposed the concept of expenditure targets as a means to slow the growth of Medicare expenditures for physician services. Congress adopted that concept and established a system of Volume Performance Standards as part of the physician payment reform in OBRA89.

The VPS is not a limit on total payments. Rather, the VPS sets a standard against which actual expenditure growth is to be compared. Annual fee increases will depend in part on the extent to which expenditures exceed or fall short of this standard.

OBRA89 requires the Secretary and the Commission to recommend VPS rates of increase each year. VPS rates of increase are to be established for all physician services, and separately for surgical and nonsurgical services. Surgical services are defined by the Secretary as all services classified as "surgery" in the Medicare claims reporting system that are performed by surgeons, plus all assistance at surgery.

OBRA89 directs that these recommendations take into account the following factors: inflation, growth and aging of the beneficiary population, evidence of lack of access, evidence of inappropriate utilization, changes in technology, and any other factors as appropriate.[1] The first two factors influence expenditure growth through fee levels and the number of beneficiaries to be served, while the remaining factors affect the volume and intensity of services per beneficiary. As discussed below, the difference between the Secretary's recommendations and those of the Commission arise largely from different allowances for growth in the volume and intensity of services per beneficiary.

VOLUME PERFORMANCE STANDARD RECOMMENDATIONS FOR FY 1991

On April 16, 1990, the Secretary recommended a VPS rate of increase for FY 1991 of 9.9 percent for all physician services, with increases of 8.7 percent for surgery and 10.5 percent for nonsurgical services. The Secretary made full allowances for expenditure growth due to inflation, growth and aging of the beneficiary population, and the effects of prior legislation.

After reviewing available evidence on access, appropriateness, and technology, the Secretary determined that the information available concerning those factors was insufficient to support an accurate estimate of the necessary increase in volume of services per beneficiary. Instead, the Secretary took the average growth in volume and intensity over the past five years, and reduced it by half. This gave an allowance for volume growth of 3.7 percentage points.

At its recent meeting on April 26-27, 1990, the Commission examined the Secretary's recommendations, and the rationale provided for them. The Commission then recommended an alternative VPS rate of increase based on reasoning somewhat different from the Secretary's.

The Commission reviewed evidence gathered by its staff on the factors affecting growth in the volume of services per beneficiary: limitations on beneficiary access, the amount of inappropriate services provided to Medicare beneficiaries, and new and changing medical technology. The evidence is summarized in the technical appendix to this report. It suggests that Medicare beneficiaries do not generally experience deficiencies in access that are related to the general level of Medicare fees. There is some evidence of deficiencies in access for beneficiaries in some rural and urban underserved areas, and poor beneficiaries may generally experience lower access than others. However, these specific problems with access are better addressed through focused measures such as the

[1] This includes, at a minimum, estimates of impacts of legislative changes.

bonus payments to physicians practicing in Health Manpower Shortage Areas that were enacted in OBRA89.

On the other hand, the VPS process may eventually affect the overall level of Medicare fees. If Medicare beneficiaries have difficulty obtaining care because fees are substantially lower than those of private payers, the annual conversion factor update may be an appropriate way to address access problems. The relationship between fee levels and physicians' willingness to provide care, however, is unclear. Commission analysis shows that in 1987 Medicare allowed charge levels averaged 20 percent less than those of Blue Cross and Blue Shield Plans. However, the Commission's 1988 beneficiary survey found that a very small proportion of respondents (0.3 percent) had been denied care during the past year for financial reasons. Thus, there does not appear to be a general access problem for Medicare beneficiaries related to the level of Medicare fees.

Commission review of the evidence on the extent of inappropriate care suggests that there is on balance a substantial volume of services that could be eliminated without any reduction in quality of care. However, estimates of the actual level of inappropriate care vary widely, both across areas and across procedures. Further, the percentage of payments denied by Part B carriers and PROs is typically substantially lower than the fraction of care that has been identified as inappropriate. Thus, while a considerable volume of care provided to beneficiaries appears inappropriate, it is difficult to quantify the amount of inappropriate care with any degree of accuracy. Finally, even if inappropriate care could be quantified, the question of how much of that care could be eliminated in FY 1991 would remain.

The Commission found no satisfactory way to estimate the effects of new technology on expenditures accurately. Numerous organizations were queried to identify new medical technologies. The new technologies identified by this process accounted for only a small proportion of volume growth over the period 1986 through 1988. Most believe that new technology accounts for a much larger portion of volume growth. This suggests that either the list of technologies identified omitted many major new technologies or that technology plays a smaller role than previously believed. The Commission plans to work further to develop methods for classifying and measuring the impact of technology on volume.

After reviewing this evidence, the Commission concurred with the Secretary that an accurate estimate of the increase in volume and intensity of services per beneficiary that would be justified by these factors cannot be determined from currently available information. Because of this, the Commission also used an alternative approach to develop its recommendations.

The Commission began with the baseline projection[2] of the Medicare Actuary for the rate of growth of expenditures incorporated in the VPS. It then decided what reduction in this rate of growth could be achieved without threatening loss of access or quality of care for Medicare beneficiaries. This approach is particularly appropriate for the initial years under the VPS system, during which the ability of the medical profession to affect medical practice is the factor that limits how quickly the growth rate can be slowed.

The Medicare Actuary projected a rate of growth of expenditures included in the VPS of 13.2 percent for FY 1991. The Commission judged that the rate of expenditure growth for 1991 could be reduced by two percentage points, to 11.2 percent. In effect, the Commission allowed full increases in expenditures for inflation, increases in the number and average age of beneficiaries, and prior legislative changes, but judged that the medical profession can achieve a reduction in the overall growth rate by reducing the growth of volume and intensity of services by 2 percentage points without compromising access or quality of care. This would still provide a 4.6 percent allowance for increased volume and intensity of services per beneficiary.

The difference between the Commission's recommendation of 11.2 percent and the Secretary's recommendation of 9.9 percent arises from two sources: the choice of the expenditure baseline and the reduction of volume growth from that baseline figure. The Commission and the Secretary use the same estimates for the impact of inflation, beneficiary growth and aging, and existing legislation. However, the Secretary used the historical rate of growth of volume to determine a baseline rate of expenditure growth of 13.6 percent. The Commission, in contrast, used the Actuary's projections rather than historical data, yielding a baseline rate of growth of 13.2 percent.[3] The Secretary reduced his allowance for growth in volume per capita to half the historical rate, or 3.7 percentage points, while the Commission judged that a 2 percentage point reduction in projected volume growth was the most that the medical community could feasibly achieve. The net effect of a slightly lower baseline (0.4 percentage points) but a smaller reduction from that baseline (1.7 percentage points) led the Commission to recommend a VPS rate of increase that was 1.3 percentage points higher than the Secretary's.

OBRA89 called for the Secretary and the Commission to recommend a separate VPS for surgical and nonsurgical services. The Secretary recommended VPS rates of increase of 8.7 percent for surgery and 10.5 percent for other services, but the difference is accounted

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[2] The baseline refers to the expenditures expected to occur in FY 1991 with no further changes in legislation and no action by physicians to control costs.

[3] Minor differences also arose because the Secretary used an additive formula to determine the baseline, similar to the process which OBRA89 specifies for the default formula. The Commission, in contrast, used a multiplicative formula to determine its baseline from the Actuary's data.

for entirely by the effects of expansion of benefits resulting from prior legislation.[4] The Secretary gave surgical and nonsurgical services the same allowance for increased volume and intensity per beneficiary.

The Commission recommends VPS rates of increase for surgical and nonsurgical services that are 1.0 percentage point farther apart than those recommended by the Secretary. This reflects the Commission's baseline projection that the volume of surgical services will increase less rapidly than nonsurgical services in 1991. This projection is based on evidence that the Medicare volume of surgical services grew less rapidly from 1986 to 1988 than that of nonsurgical services. With evidence that the rate of growth of cataract surgery has slowed considerably since that time, the differential is likely to be even wider.[5] This 1.0 percentage point difference plus the projected differences due to prior legislation led to Commission recommendations of VPS rates of growth of 9.3 percent for surgical services and 12.1 percent for nonsurgical services.

The Commission also largely agrees with the Secretary's statement that the VPS recommendations should be amended for future changes in legislation. Legislative measures to change coverage or constrain allowed charges would affect FY 1991 outlays and should be reflected in a revised recommendation. However, it is not clear that the recommendations should be lowered to reflect legislative changes aimed at directly reducing utilization. The medical profession is expected to slow expenditure growth by reducing inappropriate care through development and use of practice guidelines and by working with PROs and carriers. It would seem that reductions expected to result from carrier and PRO activities that are directed by legislation, such as prior authorization of assistants at surgery, should not be offset by lowering the VPS rate of increase.

THE FUTURE OF THE VPS PROCESS

The Commission views the 1991 VPS as the next step in a long range plan to slow expenditure growth to a sustainable level, such as the trend in the rate of growth of the Gross National Product. The Commission believes that this can be accomplished within five years. Each year, more resources would be available for physician services, but eventually the increase would accommodate only inflation, increases in the number and aging of beneficiaries, and a small allowance for new technology or to remedy any identified shortfalls in access. The Commission recognizes that beneficiaries should receive the benefits of new technology that is effective but believes that increases in

[4] Prior legislation increased benefits primarily for nonsurgical services: mental health coverage was extended and routine Pap smears were covered. Also included is the final effect of fee reductions for overvalued procedures. These legislative measures are projected to add 1.9 percentage points to expenditure growth for nonsurgical services and 0.1 percentage points to expenditure growth for surgery.

[5] Details of this analysis are presented in the technical appendix.

volume of new services can be offset by reductions in services now provided that are of little or no benefit. As payment reform progresses, this goal should be reexamined in light of new information and developments.

The dollar reductions in Medicare outlays implied by this strategy are quite large. Over the period 1980 through 1990, Medicare expenditures for physician services grew at a rate which is more than 8 percent per year faster than the growth in nominal GNP, resulting in a more than quadrupling of Medicare outlays for physician services as compared to a doubling of nominal GNP. If this were to continue, the 1990 expenditure of roughly $28 billion for physician services will have grown to $56 billion by 1995. If, on the other hand, expenditure growth were gradually reduced to the rate of growth of GNP over the next five years, 1995 expenditures would be $45 billion dollars.[6]

The path to this goal, however, should not be driven by a rigid policy rule. The course by which expenditure growth is slowed must give due consideration to the welfare of beneficiaries. Beneficiary access to appropriate care must be monitored closely during this period to ensure that Medicare outlays are not being reduced too rapidly. The tools available to the medical community to reduce inappropriate care without loss of access to appropriate care and the emergence of new and medically beneficial treatments might accelerate or moderate the pace at which expenditure growth can be reduced. These elements will require closer scrutiny as the VPS process continues.

CONCLUSION

The goals of the VPS system cannot be reached overnight. The growth of expenditures must be reduced at a prudent pace. The Secretary has recommended a VPS rate of increase of 9.9 percent. The Commission believes that requires too great a reduction of the growth in volume in light of what the medical profession can achieve with the tools available and instead recommends a rate of increase of 11.2 percent.

The Commission expects that expenditure growth can be slowed within five years to a sustainable level. However, the uncertainty inherent in these predictions requires that these expectations be reassessed each year in light of more recent information on access to services, technological change, appropriateness of current practice, and the ability to identify and reduce services of little or no benefit. The annual recommendation of a VPS and, beginning next year, the update in fees, will provide an opportunity for the Secretary, the Commission, and the Congress to revisit these questions each year.

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[6] This assumes the CBO's projected rate of growth of nominal GNP of 6.5 percent per year from 1990 to 1995, a baseline rate of growth of Medicare outlays which is 8.3 percent per year higher, and a linear reduction in Medicare outlay growth from 14.8 percent to 6.5 percent over the period 1991 through 1995.

Volume Performance Standards and the programs to support the medical community's response to them are taking us into new territory. While some other societies have been able to hold expenditure growth in health care to levels they consider affordable, none has done so within a system as fragmented and pluralistic as ours. And no society has resolved to develop the base of information needed to determine how best to spend its health care resources, as we seek to do through research on effectiveness and the determinants of outcomes.

With these new policies and programs, we have an unprecedented opportunity not only to bring expenditure growth to a sustainable level, but to maintain access and quality and to improve the value received for these expenditures. This will require prudent and thoughtful management of the Volume Performance Standard system by the Congress and strong support by the federal government for the medical profession.

TECHNICAL APPENDIX

The Omnibus Budget Reconciliation Act of 1989 (OBRA89) established Volume Performance Standards (VPSs) for Medicare physician services. The VPS rate of increase sets a standard against which actual spending increases are to be compared. Future fee updates will be influenced by the difference between the VPS rate of increase and the actual change in expenditures.

OBRA89 directs the Secretary of Health and Human Services to recommend a VPS rate of increase. On April 16, 1990, the Secretary recommended a VPS rate of increase of 9.9 percent for FY 1991 (DHHS, 1990a). The recommended VPS rates of increase for surgical and nonsurgical services were 8.7 percent and 10.5 percent, respectively (Table 1).

OBRA89 requires the Physician Payment Review Commission to comment on the Secretary's VPS recommendation. In developing its comments for the FY 1991 VPS rate of increase, the Commission examined recent trends in volume of services and expenditures, as well as information on beneficiary access, inappropriate care, and technology growth. This technical appendix summarizes the material used in developing the Commission's comments.

The first section of this appendix presents information on recent trends in Part B spending and volume. In addition to outlining the growth and variability in Part B spending, trends in surgical and nonsurgical volume are analyzed using Part B Medicare Annual Data (BMAD) files. The second section examines evidence on the level of inappropriate care. Several recent reviews of the literature on appropriateness are summarized, along with information on carrier and PRO denial of claims. The third section analyzes the issue of access to care, identifying the types of access problems that are best addressed through the VPS and fee update process. This section also includes a detailed comparison of Medicare allowed charge levels with those of Blue Cross and Blue Shield Association Plans. The final section estimates the impact of new technologies on volume growth. Recent years of BMAD data are used to evaluate the proportion of expenditure growth that can be attributed to the diffusion of new technologies.

TRENDS IN MEDICARE EXPENDITURES FOR PHYSICIAN SERVICES

This section presents information on historical trends in expenditures, prices and volume. Much of the information is taken from the report of the Trustees of the Supplementary Medical Insurance (Part B) trust fund (Board of Trustees, 1990), and agrees well with data

supporting the Secretary's VPS recommendation. Other sources of data, however, are used to analyze growth in surgical and nonsurgical services. The volume of surgical services appears to have grown less rapidly than the volume for other types of services over the 1986 to 1988 period. Because cataract surgery accounts for such a large portion of all surgical expenditures, and because the volume of cataract surgery has leveled off since 1988, it is likely that surgical volume will continue to grow more slowly than nonsurgical volume.

Trends for Part B and Physician Services

The proporation of Medicare Part B reimbursements per enrollee attributable to physicians services had been declining since the late 1970's (Table 2). Over the period 1978 through 1984, expenditures for physician services constituted about 80 percent of Part B reimbursements. By 1988, however, physician services had fallen to less than three-quarters of Part B reimbursements, primarily due to rapid increases in facility fees for hospital outpatient departments and ambulatory surgical centers. Over the past 10 years, Medicare outlays per beneficiary for physician services averaged an annual growth rate of 13.6 percent, while over the last five years the growth rate was 10.1 percent.[1]

An analysis of allowed charges per enrollee gives an almost identical picture of trends, with one exception. Over this period, allowed charges per enrollee for physician services grew approximately 1 percentage point more slowly than did expenditures. This discrepancy is usually attributed to the declining value of the $75 deductible. As the deductible falls relative to total incurred charges, Medicare pays a higher fraction of the total and outlays increase more rapidly than incurred charges.

Growth in allowed charges for physician services can be decomposed into price and volume components (Table 3). As above, changes in volume per enrollee are tabulated. Volume includes growth in the number services as well as changes in the mix of services.[2] Over the five year period ending in 1988, volume growth was 5.6 percent per year, more than half of the growth in total allowed charges per enrollee of 9.1 percent per year. Over the ten year period ending 1988, volume growth averaged 6.4 percent per year, while total allowed charge growth averaged 12.8 percent per year.

Annual growth in volume of services was quite volatile over this period, ranging from 3.4 to 10.3 percent. This volatility of volume growth could complicate the VPS process. Large, random changes in total expenditures might have to be accounted for when comparing the VPS rate of increase and actual expenditure increases.

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[1] Much of the decline appears to be associated with fee constraints by the Medicare program.

[2] More properly, volume also includes all unmeasured factors such as measurement error and changes in coverage and availability of services.

An upper bound on the unpredictability of Part B expenditures is provided by the United States Per Capita Cost (USPCC). The USPCC is a prediction of Medicare outlays calculated by the HCFA Office of the Actuary as part of the process for setting payment rates for HMO risk contracts. Predicted Part B expenditures per beneficiary were almost 10 percent too low in 1987 and more than 6 percent too high in 1988 (Table 4).

Although the timing of the USPCC projection and the VPS recommendations are similar, two factors should reduce uncertainty in the VPS process relative to that for the USPCC. First, the projection errors in the USPCC include the effects of changes in legislation enacted after the USPCC rates are published. Such legislative impacts are handled separately under the VPS process. Second, uncertainty in base year expenditures has an impact on the USPCC calculation, but not on the VPS. Unlike the USPCC, which establishes a dollar amount for expenditures, the VPS sets a percentage increase in expenditures. The FY 1991 VPS will not be compared with the actual expenditure increases until 1992, at which time expenditures for FY 1990 and FY 1991 should be known with a high degree of accuracy.

In any case, considerable judgment, discretion, and supplemental data analysis can be used in factoring the FY 1991 VPS into subsequent fee update decisions. The VPS established this year will affect the fee update recommendation made in May of 1992 (Table 5), at which time essentially complete expenditure data for FY 1990 and FY 1991 will be available. OBRA89 calls for the fee update process to consider, in addition to a comparison between actual expenditure increases and the VPS, such items as unexpected changes in volume. Thus, much more complete and accurate information will be available at the time this VPS affects fees, and if an extraordinary fluctuation in volume were to occur in FY 1991, it would not be mechanically reflected in the subsequent fee update recommendation.[3]

Trends for Surgery

Before examining the evidence on recent trends in expenditures for surgery and for other services, the distinction must be made between type of service surgery (TOS surgery),[4] as it is recorded in the Medicare claims processing system, and surgical services as defined by the surgical VPS. The surgical VPS will include all services with recorded TOS surgery that were performed by physicians who identified themselves to Medicare carriers as

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[3] The default formula contains further safeguards. The fee update cannot be reduced more than 2 to 3 percentage points below the Medicare Economic Index (MEI). Thus, a major upward fluctuation in volume would not result in an actual fee decrease if the default formula governs the fee update. In addition, to the extent that lags in data processing and reporting exaggerate year-to-year changes, requirements for the direct submission of all claims by physicians and the implementation of the new Common Working File claims processing system should reduce variation in reported expenditure growth.

[4] The term "TOS surgery" will be used throughout to distinguish procedures which are recorded as surgery in the Part B claims processing system from the procedures which are to be included under the surgical VPS.

surgeons.[5] The surgical VPS will also include all charges for assistance at surgery (DHHS, 1990b).[6] The principal difference between TOS surgery and the surgical VPS is that the VPS excludes most endoscopies, which have been growing substantially faster than other surgical procedures. Long-term trend data on TOS surgery (and assistance at surgery) are readily available. Data on trends for the surgical VPS as defined above are available only for recent years.

The data presented in Table 6 indicate roughly how rapidly total allowed charges have grown for TOS surgery versus charges for other services. From this analysis, surgery's role as the primary cause of rapid increases in total allowed charges appears to have dimished. Over the period 1983 through 1988, allowed charges for TOS surgery grew one percentage point per year faster than allowed charges for other types of service. However, since 1986, allowed charges for TOS surgery have grown 2.3 percentage points per year more slowly than allowed charges for other types of service. In part, that was due to higher fee updates for nonsurgical services, including both a higher update for primary care in 1988 and fee reductions for overpriced surgical procedures in 1987 and 1988.

Commission staff have examined the growth of surgery, as defined for the VPS, using several years of BMAD data. Because the BMAD data have known reporting problems, only a subset of carriers that were judged to have consistent data from 1986 through 1988 were used in the following analysis. Nineteen carriers were rejected for various reasons, including incomplete data, inaccurate data, extensive use of local HCPCS codes, or changes in the data processing system that altered reporting. Data from the remaining 37 carriers are used to generate the tables below.[7]

During the period 1986 to 1988, prices for surgical procedures grew 1.6 percent per year more slowly than prices for nonsurgical procedures, for reasons noted above (Table 7). Volume of services grew 1.7 percentage points more slowly for surgical than for

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[5] For the purposes of defining the VPS, surgeons include the following: general surgeons, neurosurgeons, obstetricians, gynecologists, ophthalmologists, oral surgeons, orthopedic surgeons, otorhinolaryngologists, plastic surgeons, proctologists, thoracic surgeons, urologists, hand surgeons, podiatrists, dermatologists, and multispecialty clinics (DHHS, 1990b).

[6] Due to time constraints, the analysis presented below was done before the official definition of the surgical VPS was released. The charges of podiatrists and dermatologists are included in the surgical VPS but omitted from the definition of surgery used in this analysis. These specialties account for less than 10 percent of surgical charges. Where possible, approximate corrections for the omitted specialties are given in footnotes.

[7] The carriers included in this analysis are: AK, AL, AR, AZ, CA (both), CT, GA, HI, IA, ID, KY, LA, ME, MI, MN (Northern), MO (both), MS, MT, NC, ND, NH, NM, NV, NY (Western), OK, OR, PR, SD, TN, TX, UT, VA, VT, WA, WI, WY, and the carrier for railroad retirement claims. These carriers processed roughly 54 percent of total physicians' services allowed charges in 1988.

nonsurgical services. This again shows that surgery has not been the primary force behind recent increases in charges and volume.[8]

The Importance of Cataract Surgery

Cataract surgery plays a particularly important role in the determination of price and volume changes over this period. Surgery for cataract is the single most important procedure in terms of Part B dollars, and constitutes more than one-fifth of the allowed charges included in the surgical VPS.[9] Cataract surgery was the first procedure to be identified as overvalued. Not surprisingly, cataract surgery has a significant impact on the growth rates of total allowed charges, prices, and volume over the 1986-1988 period.

The volume of cataract surgery has grown rapidly over the last decade. However, the volume of cataract lens implantation surgery has leveled off, beginning either with the latter half of 1987 or with 1988, and on a per-person basis, the volume of cataract surgery actually began to decline in 1988 (Stark, Sommer, and Smith, 1989). This may show that the backlog of potential lens implant recipients created by the improved cataract surgery technology has largely been depleted (Stark, Sommer, and Smith, 1989). If so, the volume of cataract surgery may be expected to remain level or possibly even decline over the next few years.[10]

As the lower portion of Table 7 shows, a leveling-off in cataract volume could have a substantial impact on differences in volume growth for surgical and nonsurgical VPSs. This portion of the table illustrates what would have happened if there had been no growth in cataract surgery between 1986 and 1988. Under this scenario, the volume of surgical services would have increased 3.9 percentage points per year more slowly than the volume of nonsurgical services.

While these numbers are rough, and while the definition of surgery used here excludes podiatrists and dermatologists, this analysis indicates two things. First, during the period

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[8] As noted above, podiatrists and dermatologists were excluded from the definition of surgery used here. Table 10 shows that these specialties had high rates of charge growth over this period. Adding these specialties to the surgical procedures data would increase surgical charge and volume growth by roughly 0.5 percent, and reduce the surgical/nonsurgical difference in volume growth to 1.2 percent per year.

A check on this figure can be obtained from the growth in charges for TOS surgery. Charges for TOS surgery grew 2.3 percent more slowly than for other services (Table 7), but fees grew 1.6 percent more slowly (Table 8), implying that volume growth for TOS surgery grew 0.7 percent more slowly. However, TOS surgery includes endoscopies, while the surgical VPS largely does not. Moving the rapidly growing endoscopies from the TOS surgery category increases the difference in volume growth by roughly 0.5 percent, to 1.2 percent.

[9] This falls below one-fifth of surgical dollars when podiatrists and dermatologists are added to the definition of surgery.

[10] Data used by Stark, et al., (1989) are derived from reports that intraocular lens manufacturers must file semi-annually with the Food and Drug Administration detailing the number and type of lenses implanted. Sources within the intraocular lens industry project no growth or slight declines in the number of lenses sold from 1988 through the mid-1990s (Sherbondy, 1990).

1986 to 1988, the volume of surgical services probably grew more slowly than volume for nonsurgical services. Second, a reduction in the growth of cataract surgery, if not offset by increases in other types of surgery,[11] will substantially reduce the growth in surgical volume.

Other Trend Data

Growth in allowed charges measured for various subcategories of service provides additional information on recent changes in Medicare outlays. The remainder of this section uses BMAD data to characterize the growth in allowed charges over the 1986 through 1988 period along several dimensions.

Trends by Procedure Code Groups. Changes in total allowed charges, prices and volumes for selected groups of procedures provide a more detailed look at trends in Part B expenditures for physician services (Table 8). In terms of volume, the fastest growing medical procedures were cardiac catheterization and other technical procedures. For surgery, arthroscopy and spinal surgery were the fastest growing categories. For radiology, magnetic resonance imaging was clearly the fastest growing component, with volume more than doubling each year over the period 1986-1988. Automated multichannel tests also grew rapidly over this period.[12]

The impact of the overpriced procedure legislation and other changes can clearly be seen in the annual price growth variable. Fees for coronary artery bypass graft, cataract surgery, and assistance at surgery held steady or actually declined. Fees for anesthesia were essentially constant, reflecting changes in payment for anesthesia for cataract surgery as well as reductions in payment for supervision of nurse anesthetists.

Trends by Place of Service. An analysis of trends by place of service over the period 1986-1988 shows a well-established pattern (Table 9). Charge growth was slowest in hospital inpatient settings and most rapid in hospital outpatient and ambulatory surgical center settings.

Trends by Reported Specialty. Calculation of trends in expenditures by physician specialty is somewhat difficult. The proportion of allowed charges reported under such specialty categories as "group practice" and "miscellaneous" fell over this period for many carriers. However, the growth rates by specialty are consistent with other data (Table 10). Optometrists top the list, due to changes in Medicare rules allowing them to provide postoperative care. After that, gastroenterologists, cardiologists, and independent labs have the highest rates of allowed charge growth.

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[11] For example, individuals may develop secondary cataracts around or over an implanted intraocular lens. The laser destruction of secondary cataracts has become a very rapidly-growing surgical procedure.

[12] Data on automated tests may be inaccurate, however, due to overcounting of frequencies of tests in 1986.

Change in Visit Mix. Finally, for visits, volume growth can be decomposed into growth in the number of visits and changes in the mix of visits (Table 11). For non-emergency visits, changes in the mix of visits play a negligible role in the overall growth of charges. This is consistent with the findings of McMenamin (1988), who traced volume growth for a few carriers over the period 1983 to 1985. However, total allowed charges for emergency visits grew quite rapidly over this period.[13] In this case, an increase in the average visit intensity accounted for approximately 3.6 percent per year growth in allowed charges.

ACCESS TO CARE

The Commission has long viewed measuring and monitoring beneficiary access to necessary services as fundamentally important to a VPS system. This is because the goal of such a system is to control growth in expenditures while maintaining access to appropriate care. Accordingly, the 1989 physician payment reform legislation requires that the current extent of lack of access to care be considered in setting the annual performance standard. This suggests that if shortfalls or barriers are known to exist, increased growth in expenditures is acceptable to the extent that it encourages the provision of services to beneficiaries who were previously underserved.

This section considers several issues regarding access that are relevant to setting the performance standard for FY 1991. The discussion reviews how the Commission has defined access in the past, the types of access barriers that Medicare beneficiaries may experience under payment reform, and which of these barriers are appropriately addressed in setting the annual update of Medicare physician fees. It concludes by considering what is known about current access to care for Medicare beneficiaries and how this evidence should be applied in setting the VPS for FY 1991.

Defining Access

In the past, the Commission has defined access broadly to encompass factors that are related to a population's ability to enter the health care system when they need care. This ability is influenced by the characteristics of the delivery system itself (such as physician supply and the availability of hospital beds) and characteristics of the individuals who make up the population (such as age, frailty, insurance coverage, income, education and race) (PPRC, 1989b). For the Medicare population, variables affecting potential access include the extent of Medigap coverage, having a regular source of care, and the

[13] The Congressional Research Service (U.S. Congress, 1989), using 1985-1987 BMAD data from all carriers found a similar strong growth in emergency care volume.

magnitude of out-of-pocket costs relative to income. The level and mix of service utilization is considered to be an indicator of realized access.

Anticipated Effects of Physician Payment Reform on Access

The Commission anticipates that payment reform will be accompanied by behavioral responses on the part of both beneficiaries and physicians that may affect access to care. For example, changes in relative payment across types of service and geographic areas could affect physician choices of specialty and practice location. Changes in co-insurance and balance billing amounts will affect beneficiaries' financial burden and could result in their utilizing more, fewer or a different mix of services than they do currently. The Medicare Fee Schedule may also affect physician decisions regarding participation, assignment and willingness to care for Medicare beneficiaries.

The Commission's plans for monitoring beneficiary access to physician services were outlined in its 1989 and 1990 reports to Congress. These include consideration of differential effects on vulnerable subpopulations (for example, poor, frail or seriously ill beneficiars) and on specific categories of physician services (such as evaluation and management services, diagnostic tests, surgery and emergency room care). A number of data sources including the National Medical Expenditure Survey (1987), the National Ambulatory Medical Care Survey (1989), the continuous Health Interview Survey and the Current Beneficiary Survey can be used to investigate these concerns.

Under OBRA89, the Commission is also required to comment on the Secretary of Health and Human Services' efforts to monitor changes in utilization by geographic, population and service-related categories, the charges of nonparticipating physicians and increases in the number of unassigned claims. In developing its recommendations, the Commission is further required to convene and consult a panel of experts to evaluate the implications of medical utilization patterns for the quality of and access to patient care.

Access Issues Relevant to Setting the Annual VPS

Not all of these effects on access are relevant to setting the annual performance standard. This is because as long as there is a single conversion factor to be updated, the actual level of the VPS will not affect the charge structure. Thus while beneficiaries in some demographic groups or who use some types of services may face barriers to care, a uniform increase in Medicare fees would not necessarily address these problems. Other policies such as the 10 percent bonus payments for physicians practicing in Health Manpower Shortage Areas might be more successful in improving access.

Conversely, if Medicare beneficiaries have difficulty obtaining care because fees do not keep pace with those in the private sector, the annual conversion factor update may be an appropriate instrument. The relationship between fee levels and physicians' willingness to provide care, however, is unclear. On the one hand, once the initial performance standard is set, fee levels will be determined largely by increases in the volume of services

provided. Therefore, low fee levels will result from high volume that presumably reflects improved access, at least for the typical beneficiary. On the other hand, the Commission's preliminary work on Medicaid physician payment indicates that access problems for Medicaid recipients partially reflect the decisions of physicians to limit their Medicaid caseload in response to low fee levels.

Evidence of Access Barriers Relevant to Setting the Annual VPS

Although some data exists on barriers to access for some subgroups of the Medicare population (for example, Medigap coverage is less common among poor, black, older and sicker beneficiaries), there is little evidence to suggest that physicians are currently refusing to treat Medicare patients due to low payment. Virtually the only data available comes from the Commission's 1988 survey of beneficiaries (PPRC, 1989b). The survey found that a very small proportion of respondents (0.3 percent) had been denied care by a physician during the past year for financial reasons. About 5 percent of beneficiaries eligible for both Medicaid and Medicare reported that they had trouble finding a physician who would accept Medicaid. Concern that low payment rates in certain geographic areas may contribute to localized physician shortages prompted the Congress to enact a 10 percent payment bonus for physicians in Health Manpower Shortage Areas. It is not known what effect Medicare payments rates have on physicians' willingness to locate in certain geographic areas.

Because the VPS process will eventually affect fee levels, evidence of the impact of fee levels on access is particularly important. The Commission's 1990 report summarizes what is known about the relationship between Medicaid reimbursement and access to care. Low fee levels discourage physician participation in Medicaid, but the evidence suggests that they do not restrict the number of services obtained by Medicaid recipients. Instead, low fees result in a shift of service away from physician offices to hospital outpatient departments.

A Comparison of Medicare and Blue Cross/Blue Shield Allowed Charges

While Medicaid payment rates vary widely compared to Medicare rates, perhaps a more relevant comparison would be between Medicare payment rates and the payment rates of private insurers. The Blue Cross and Blue Shield Association recently provided the Commission with information comparing Blue Cross and Blue Shield Plan (Plan) allowed charges for selected procedures to the corresponding Medicare allowed charges.[14] There are numerous caveats concerning the comparability, completeness, and accuracy of the data (Table 12). Bearing those caveats in mind, the data indicate that, in 1987, Medicare allowed charges averaged roughly 20 percent lower than comparable Plan allowed charges.

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[14] The Commission would like to thank Douglas S. Peters and Carron Maxwell of the Blue Cross and Blue Shield Association for making this data available.

Source of Data. Beginning in 1988, the Association began compiling data on charges and payments for physician services from several Plans. Plan claims were processed to generate summaries of claims by CPT-4 code and physician specialty. Payment data from 1987 were merged with the BMAD procedure file, allowing comparisons to be made between each Plan's allowed charges and the corresponding Medicare allowed charges in the Plan's area.

Allowed charges were used as the basis of comparison, rather than amounts paid, for several reasons. First, variations in coverage policy, such as the level of deductibles and copayments, introduce large differences in amounts paid per procedure that are not present in the amounts allowed. Second, mean allowed charges give a relatively uniform comparison with the Medicare data. In many circumstances, the allowed charge represents the physician's total reimbursement from all sources.[15]

The Association has provided the Commission with data to allow a comparison of Plan and Medicare allowed charges. In order to avoid identifying individual Plans, the Association provided information on the ratio of the Plan allowed charge to the Medicare allowed charge for 50 procedures for 24 Plans.

Reasons for Medicare and Plan Payment Differences. Medicare and Plan allowed charge levels may differ for a variety of reasons. First, there are the often substantial differences in the definition and reporting of services. These technical discrepancies may affect many of the comparisons. In addition, however, payment rates reflect both the structure of Plan coverage and the rules governing the Medicare program.

Limits on data comparability. Many of the circumstances surrounding the processing of Plan and Medicare claims could generate apparent disparities between Plan and Medicare average allowed amounts. Variations in global fee definitions are one source of discrepancy. Plans and carriers may use different definitions of services included in a global surgical fee. This may cause some ratios of Plan to Medicare allowed charges to be less than one where the Plan uses a less inclusive global fee definition, or more than one where the carrier has the more inclusive definition.[16] In addition, there are often inconsistencies in the definition and recording of professional components and total components of service for radiology and pathology procedures.[17] Because of the obvious variation in ratios for professional and total components, radiology and pathology

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[15] This is true for all claims from Plan and Medicare participating physicians. This is also true for Medicare claims taken on assignment.

[16] However, many of these Plans also serve as Medicare carriers. Carriers have the discretion to determine the global fee definition, so it is likely that in many cases the definition for Medicare and private business is similar.

[17] The professional component charge for a routine X-ray, for example, typically pays for the physician's interpretation, while the total component pays for the interpretation plus the cost of taking and developing the film. Charges for the professional component average roughly 40 percent of the charge for the total component.

procedures were excluded from the analysis presented below. Finally, some Plans and carriers differ in the recording of charges and frequencies for some CPT-4 codes. For example, some Plans had extremely high allowances and consequently high Plan to Medicare ratios for hospital visits, probably due to the aggregation of charges and frequency counts when several visits are billed on a single claim form. Obvious outliers such as these were excluded before proceeding with the analysis.

Differences in Coverage, Contracting, and Regulations. Real differences in payment, as opposed to the technical discrepancies noted above, may arise from a variety of sources. First, while Medicare is a traditional fee-for-service system, Plans engage in selective contracting for some or all of their physician business. Plan allowances may be lower than Medicare allowances when a Plan selectively contracts with a limited network of providers. Second, the prudent payer portions of the Medicare statutes require carriers to use fee screens that are no higher than fee screens used in the other parts of their business. In practice, this means that for those Medicare carriers that are also Plans, the Medicare prevailing charge should be no higher than the Plan prevailing charge. Because so many carriers are Plans, this restriction should result in Medicare allowed charges that are on average lower than corresponding Plan allowed charges. Finally, increases in Medicare prevailing charges are constrained by the growth in the Medicare Economic Index, a measure of inflation for inputs into physician services. More recently, prevailing charges have been frozen, different updates in prevailing charges have been given to primary care and other services, and prevailing charges for selected overpriced procedures have been reduced. This has resulted in an increase in reductions of charges from billed amounts for Medicare patients.[18]

Method of Analysis. The basic data consist of ratios of Plan mean allowed charge to Medicare mean allowed charge for 50 procedures for 24 Plans. As discussed above, data for radiology and pathology were removed due to inconsistencies in the coding of professional components of bills. In addition, any ratios less than 0.5 or over 2.0 were declared outliers and removed from the data. Most of these outliers were directly traceable to differences in the definition of the services to be billed under a single CPT-4 code. Data for procedures reported by fewer than 12 plans were removed. This left information from 36 procedures, which together cover roughly 37 percent of all Medicare charges for physician services.

After this, an average Medicare to Plan ratio was calculated for each procedure code. These average ratios were then weighted using total Medicare allowed charges to arrive at the final weighted ratio of Medicare to Plan allowed charge. Distributions of the individual ratios were also calculated. Results are summarized in Table 12.

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[18] The average percentage reduction in charges for assigned claims went from 22.5 percent in 1980 to 27.9 percent in 1987 (U.S. House of Representatives, 1989).

Results and Interpretation. Medicare currently allows only about 80 percent as much as the Plans do, on average (Table 12). While it is difficult to assess the accuracy of this figure, other evidence suggests that it is a reasonable estimate. In FY 1987, Medicare allowed charges were 72 percent of submitted charges for assigned claims (U.S. Congress, House of Representatives, 1989). Data from the 1983 Physician Practice Cost and Incomes Survey (NORC, 1985) suggest that charge reductions for Blue Shield Plans are somewhat lower than for Medicare, consistent with the findings presented here.[19]

In addition, there seems to be considerable variation in the ratio of Medicare to Plan allowed charge. In one area, Medicare appears to allow only about two-thirds of what the corresponding Plan allows, while in another area Medicare allowed charges appear to be roughly on a par with the Plan's.

At first glance, Medicare allowed charges for surgical services seem much closer to Plan levels than do Medicare allowed charges for nonsurgical services. However, it is difficult to place much confidence in that apparent surgical/nonsurgical difference. First, the global service definitions for surgical services may differ between Plans and carriers. Second, the nonsurgical services consist primarily of visits, and the mix of specialties billing under those visit codes may differ for the two payers.

It is not clear what this information implies for the VPS rate of increases, and ultimately for the fee update process. Currently, Medicare allowed amounts are substantially lower than those of the Plans. That might indicate that restraint is called for in further reducing Medicare fee levels. On the other hand, beneficiaries in areas with relatively low allowed charge levels do not appear to experience access problems. This might indicate that general fee reductions could take place before problems of access due to insufficient payment began to develop.

Finally, there is the question of whether Medicare fee levels might eventually affect fees paid by other payers. DRG-based prospective payment has been adopted by numerous Blue Cross and Medicaid programs since the 1983 inception of the Medicare Prospective Payment System for hospitals, so there is precedent for private-sector response to Medicare initiatives. It is possible that the other payers may move to narrow differences between Medicare allowed amounts and their own allowed amounts.

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[19] Data from the codebook accompanying the data tape for the NORC survey showed a mean charge reduction of 14.9 percent for Medicare, 11.3 percent for Blue Shield Plans, and 8.8 percent for private insurers using 1983 data. Since the actual 1983 Medicare charge reduction was well over 20 percent (U.S. Congress, House of Representatives, 1989), this simple analysis of the survey data is probably not very accurate, but it does confirm that Medicare charge reductions are larger than those of other payers.

INAPPROPRIATE UTILIZATION

The amount of inappropriate care provided to Medicare beneficiaries plays a role which is in some sense opposite to that of access outlined above. Where a lack of access shows that some potentially beneficial services are not being provided, inappropriate care generally shows that unnecessary services are being provided. Research finds substantial levels of unnecessary care, but much lower percentages of care are being denied payment. VPSs are intended to encourage the implementation of guidelines and other measures to reduce inappropriate care.

Defining Inappropriate Care

Several definitions of inappropriate care have been used in empirical studies. Inappropriate care, in the context of overuse,[20] is care in which benefits do not exceed costs. Within that broad guideline, Brook et al. (1989) lay out three practical ways in which appropriateness can be defined. One criterion is benefit/risk: do health benefits exceed risks and potential morbidity? This is similar to Leape's definition of unnecessary surgery as surgery which provides little or no physical benefit to the patient (Leape, 1989). A second criterion is cost/benefit: does the sum of all benefits exceed risks and costs, both medical and financial. Finally, Brook et al. include a catch-all category where appropriateness is defined implicitly by the parties doing the study.

The site and duration of care are elements of appropriateness judgments rendered by the U.S. General Accounting Office (1989) as well as by PROs and by some researchers reviewing hospitalizations. In that context, appropriateness is judged not only on whether or not the provision of a service was necessary, but also where the service should best be provided and for how long the beneficiary should receive care.

The amount of care found to be inappropriate clearly will depend upon the definition used. Brook et al. (1989) point out that all services judged appropriate by benefit/cost criterion, for example, must also be appropriate by the benefit/risk criterion, but not vice-versa. Implicit criteria of appropriateness seem to depend strongly on circumstances. International comparisons (Brook et al., 1988) show that physicians in the United kingdom, who perform within a much more resource-constrained context, were less likely to judge intensive treatments to be appropriate than were their U.S. colleagues for a given set of circumstances. Finally, PRO reviewers could agree that a procedure was appropriate, but could disagree on whether it was better performed in an inpatient or outpatient setting.

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[20] Inappropriate care can also include underuse. However, underuse of services seems more appropriately covered under the rubric of access, and relatively few studies address underuse.

Evidence of Inappropriate Care

Three sources of information are analyzed here to provide measures of inappropriate utilization. First, the results of several recent reviews of the literature on inappropriate hospitalization and inappropriate services are presented. Second, carrier and PRO denial rates are compared across states. Finally, state-to-state variations in Part B volume and expenditure per beneficiary are compared.

Survey of Appropriateness Literature. Several recent surveys present results of studies on the appropriateness of medical care (Table 13 and 14). Research has tended to concentrate on procedures, meaning largely surgical care, and on hospitalizations.

Estimates of inappropriate hospital admissions show a considerable range, from 6 percent to 40 percent (Table 13). Estimates seem to center around the range of 10 to 15 percent. However, all of the hospitalization data are from the pre-PPS to just slightly post-PPS period. PPS seems to have caused a major shift on the site of care from inpatient to outpatient settings. Since the primary reason for inappropriate hospitalization seems to have been an inappropriate site or level of institutional care, (Payne, 1987), these figures may overstate the current level of admissions that are inappropriate due to site of care.[21]

Estimates of inappropriate care[22] for individual procedures typically fall between 10 to 20 percent, with a range of 13 to 60 percent (Table 14). While there is considerable variation, this body of research seems to show that a significant fraction of care currently provided is inappropriate according to at least one of the criteria outlined above. Many of the studies focus on procedures which are known to exhibit highly variable use rates across small areas, and so might be expected to show relatively high rates of inappropriate use.

PRO and Carrier Denial Rates. An analysis of PRO and carrier denial rates shows a sharp contrast between the measures of inappropriateness applied above and the actual denial of payment. While researchers typically find that one-tenth to one-fifth of all care is clearly inappropriate, measures of payment denials typically show 2 percent of charges denied for reasons of appropriateness.

In a review of PRO denial rates by procedure, it is clear that site of care plays an important role in the denial process, with care that is easily performed in outpatient settings being much more likely to be denied by the PROs (Table 15). This conforms well with the evidence on inappropriate hospitalization showing that the typical reason

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[21] However, these data are for admissions only, and do not include inappropriate care that is delivered during the course of a hospitalization, e.g., medically unnecessary days.

[22] These percentages are those which were designated "clearly inappropriate" in the original sources. This ignores an additional gray area of care which may or may not have been appropriate.

hospitalizations were judged inappropriate was that a lower level of care or different site of care would have been adequate to deal with the medical problem (Payne, 1987).

Corresponding SuperPRO denial rates on a sample of cases show once again the sharp distinction between actual denial of payment and a measure of inappropriateness (Table 16). SuperPRO denial rates are typically much higher than the corresponding PRO denial rates. In part, this may be due to the more limited information available to the SuperPRO: whereas the PRO could talk to the physicians involved, the SuperPRO was limited to information contained in the medical record. Alternatively, higher denials may result from a uniform application of more stringent appropriateness criteria.[23]

This divergence between PRO denials and levels of inappropriate care determined either by researchers or by the SuperPRO may show that PRO denial rates are a relatively poor measure of the amount of inappropriate care. Denial rates may depend strongly on the context of the benefits program, rather than on some "true" measure of inappropriateness. As noted above, PRO review tends to focus on the site of care, which may not be relevant in a discussion of Part B physician services expenditures. In addition, PROs typically focus on determining whether or not a disease condition is present, and often accept the presence of the underlying condition as sufficient justification for payment.

It can be seen that approximately 2 percent of submitted charges are denied by carriers as being medically unnecessary, very similar to the PRO rate of denial for hospitalization.[24] It can also be seen that denial rates vary considerably across carriers.[25]

One cause for these low and variable denial rates can be ruled out: carriers are not reimbursing physicians for procedures that are clearly outmoded. Charges for procedures deemed outmoded by the Blue Cross and Blue Shield Association Medical Necessity Program (BCBSA, 1987) account for only 0.04 percent of allowed charges in 1986.

Estimates of Potentially Deniable Claims. While PRO and carrier denial rates may be poor measures of inappropriate care, they do show the minimal level of claims volume for which it is feasible to deny payment on appropriateness grounds. While better measures of inappropriate care show much higher levels, it may be difficult or impossible to deny payment for such a large volume of care.

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[23] The GAO (1989) provides further evidence that the review criteria used by PROs differ substantially from those used by others. GAO applied RAND-type appropriateness criteria to a sample of PRO-approved coronary angiography cases and determined that approximately 20 percent of cases were inappropriate.

[24] Most carrier payment denials are for lack of coverage (either beneficiary or service) or for billing errors such as duplicate billing. Analysis of HCFA Carrier Workload Reports shows that denials for medical necessity constitute only about 14% of all denials.

[25] Carrier denial rates were correlated with PRO post-admission denial rates. A regression of carrier denial rates on PRO denial rates by state yields a statistically significant elasticity of 0.46. This could be the result either of actual state-to-state variations in medical practice, or variation in attitudes toward stringent regulation of medical practice across states.

An alternative, more conservative measure of feasible increases in screening for inappropriate care can be derived from variation in denial rates across PROs and carriers. If variations in PRO and carrier denial rates are primarily a function of the standards being applied, then an estimate of "deniable" claims can be produced by determining how many more claims would be denied if the most stringent standards were applied uniformly.

Additional payment denial would result if all PROs and carriers were as stringent, in terms of percent of claims denied, as selected standards (Table 18). In this case, these estimates show the level of additional charges that would be denied if all carriers and PROs were at least as stringent as the median, the 75th percentile, and the 90th percentile of all carriers and PROs. In the most stringent case, this would result in the denial of an additional 1.6 percent of submitted charges.

Variations in Volume and Expenditure Across States. Most analysts of small-area variations in heath care utilization associate variation in utilization with variations in physician practice style. Hence, estimates of the degree to which Part B volume varies across areas may provide some insight into the degree of variation in practice patterns. However, no strong correlation has been demonstrated between volume of services and fraction of services considered to be inappropriate (Chassin et al., 1987; Leape et al., 1990). Regression analyses by Commission staff (not shown) demonstrate that volume of Part B services per capita is not significantly correlated with either PRO or carrier denial rates.[26]

States range from roughly 25 percent above the national average to 25 percent below the national average in terms of Part B volume per beneficiary (Table 19). The range in expenditures per beneficiary is somewhat larger. Since some of the variation in volume is undoubtedly related to variations in population age and health status, this should be regarded as an upper limit on unexplained state-to-state variations in Part B volume.

TECHNOLOGY

Using what appears to be a broad measure of technology-driven volume growth, technology seemed to account for only a small portion of volume growth over the period 1986 through 1988. This is contrary to the prevailing view that new technology is one of (if not the) prime determinants of increases in volume and intensity of services. The finding of a relatively small technology impact indicates either that the methods used here omitted significant new technologies or that the effect of new technologies on volume has been overstated. Better methods for classifying and measuring the impact of technology on volume need to be developed for future VPS recommendations.

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[26] However, as noted above, PRO denial rates are strongly positively correlated with carrier denial rates.

Methods

Commission staff took several steps to quantify the proportion of spending increases that are due to changes in medical technology. Work began by identifying procedures that were associated with new or outmoded technologies. Medical societies, the American Medical Association, insurers, the Health Industry Manufacturers' Association (HIMA), and research organizations were polled by phone or mail. Several government agencies, including the Agency for Health Care Policy and Research (AHCPR), the Food and Drug Administration (FDA), and Office of Technology Assessment (OTA) were also polled. Each was asked to identify procedures or technologies that were new and diffusing into general use, as well as procedures that were outmoded or obsolete. PPRC staff also conducted a search of the literature on new technologies, beginning with technologies identified by the Prospective Payment Assessment Commission (1990).

Response to this effort was quite encouraging with regard to new technologies. Many organizations provided very complete information on new technologies, as well as on practice guidelines and standards of care. PPRC staff look forward to future cooperation from these organizations in understanding technology issues.

From a theoretical standpoint, the most appropriate method for projecting the impact of new technologies on Part B volume would be to use estimates of expected changes in utilization. This way, both existing-but-increasing technologies and true cutting-edge technologies could be factored into the calculation, and the relevant volume increases would apply to expenditures which are expected to occur in FY 1991. However, projections of service volume were both difficult to find and even more difficult to assess in terms of accuracy.

Instead, therefore, a different approach is used here. BMAD data from 1986 through 1988 are used to track the past growth of new technologies. This effectively limits the measure of technology-driven change to procedures that are established but growing, and excludes truly new procedures which were unavailable in the recent past.[27] It also is a retrospective analysis, rather than a projection of expected volume increases for FY 1991. While this is not an ideal measure of technology growth, it should provide some insight as to the general magnitude of technology-driven changes in volume.

Procedures that were associated with new technologies were examined separately from all other procedures, and differences in growth rates including and excluding these new technologies were interpreted as the impact of new technologies. Because virtually all procedures so identified by specialty societies were included in the "new technology" group,

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[27] However, new technologies account for relatively little expenditure during the first few years in which they are used. The heaviest impact on volume growth comes as the technology is diffusing into general use. For this reason, the omission of true "cutting-edge" technologies may have only a limited impact on the estimate of technology-driven growth.

this should tend to overestimate the impact of new technologies on volume growth. For example, no attempt was made to distinguish cost-reducing technologies from cost-increasing technologies. In addition, the costs of the older technologies that are being replaced by these new technologies were not netted out from the calculation.

The broad and somewhat arbitrary nature of this analysis points up some of its shortcomings. To some extent, the classification of procedures as the result of "new technology" is always difficult. The case of cataract surgery illustrates this point. Just a few years ago, cataract surgery would probably have been included in the new technologies list, boosting the estimate of technology-driven growth. However, as discussed in the section on volume trends, past rates of growth in cataract surgery are not a good predictor of future rates of growth.[28] Future analysis of the technology issue requires a more systematic approach to the classification of procedures.

Results

In the Commission's analysis, groups of procedures associated with new or diffusing technologies were identified (Table 20). The first lines on Table 20 show volume growth with and without these "high-tech" procedures. Over the period 1986 through 1988, volume growth for all physician services was 1.4 percentage points lower when these new technologies were removed from the analysis. The corresponding figures for surgical and nonsurgical procedures were 1.8 percentage points and 1.2 percentage points, respectively.[29]

Given the rather broad-brush approach used here, the seemingly small impact of new technologies is surprising. Conventional wisdom suggests that much of the growth in medical care expenditures has been driven by new technologies. This suggests either that several significant new technologies were omitted from this process, that technology has impacts which cannot be measured by considering high-technology procedures, or that the impact of new technology on volume growth is not as large as has generally been assumed. The Commission plans to develop and refine better measures of technology-driven growth over the coming year.

Aging of the Medicare Surgical Population

In addition to these procedure-specific technological changes, one broad-based technological change that was considered here is the aging of the population receiving serious surgical interventions. Improved surgical and anesthesia techniques reduce operative risks and increase the pool of individuals who are likely to benefit from surgery.

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[28] Indeed, technological diffusion typically follows a logistic curve, with a period of rapid growth both preceded and followed by periods of much slower growth.

[29] It should be noted that visits account for a large proportion of nonsurgical charges. Because visits are almost certain not to be classified as new technology, it is not surprising that less of the nonsurgical volume growth was driven by new technologies.

On average, aging of the Medicare surgical population has not been a major factor over the period 1985-1989 (Table 21). While the average age of the Medicare surgical patient has increased substantially for coronary artery bypass graft and other major cardiovascular procedures, it actually fell substantially for major joint replacements. The net effect across a spectrum of major surgical interventions was to leave the percent of Medicare surgical patients over the age of 75 approximately unchanged.[30]

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TABLES

Table 1. HHS VPS Rate of Increase Recommendation for FY 1991 (In Percent)

	Surgical Services	Non-Surgical Services	All Services
Inflation	3.6	3.6	3.6
Enrollment	1.2	1.2	1.2
Aging	0.1	0.1	0.1
Legislation	0.1	1.9	1.3
Other factors	3.7	3.7	3.7
Total	8.7	10.5	9.9

Source: DHHS 1990a.

Table 2. Part B Reimbursement Amounts Per Enrollee, Aged and Disabled

Year Ending June 30, (Millions)	Average Enrollment	All Services	Percent Change	Physician Services	Percent Change	Physician as Percent of All Services
1977	24.836	$221.30		$178.90		80.8
1978	25.556	254.39	15.0	206.66	15.5	81.2
1979	26.256	290.72	14.3	234.65	13.5	80.7
1980	26.928	345.01	18.7	278.34	18.6	80.7
1981	27.512	410.16	18.9	329.37	18.3	80.3
1982	28.048	470.33	14.7	382.40	16.1	81.3
1983	28.501	565.91	20.3	458.88	20.0	81.1
1984	29.026	639.95	13.1	513.59	11.9	80.3
1985	29.507	686.92	7.3	538.23	4.8	78.4
1986	30.082	784.49	14.2	596.19	10.8	76.0
1987	30.767	908.21	15.8	674.92	13.2	74.3
1988	31.196	1018.04	12.1	740.63	9.7	72.8

Source: Adapted from Board of Trustees of the Federal Supplementary Medical Insurance Trust Fund, 1990.

Table 3. Growth in Allowed Charges Per Enrollee for Physician Services, Aged and Disabled

Year ending June 30,	Increase Due to Price Charges	Residual Factors	Increase In Total Allowed Charges per Enrollee
1978	9	4.4	13.8
1979	7.8	4.1	12.2
1980	8.6	7.7	17.0
1981	7.7	8.3	16.6
1982	10.8	5.6	17.0
1983	8.9	10.3	20.1
1984	7.2	4.0	11.4
1985	0.8	3.4	4.2
1986	0.0	9.0	9.0
1987	5.4	5.6	11.3
1988	3.1	6.3	9.6
Ten year average		**6.4**	**12.8**
Five year average		**5.6**	**9.1**

Source: Adapted from Board of Trustees of the Federal Supplementary Medical Insurance Trust Fund, 1990.

Table 4. Comparison of Actual Part B Outlays With Predicted Part B Outlays Used for Calculation of the United States Per Capita Cost.

Calendar Year	Actual*	Predicted **	Ratio
1985	$ 62.26	$ 62.24	1.000
1986	71.54	67.02	0.937
1987	82.02	74.16	0.904
1988	91.11	96.71	1.062
1989	101.12	105.41	1.042

Source: Palsbo, 1990.

Notes: *Actual expenditures per beneficiary per month.
**Predicted expenditures per beneficiary per month.

Table 5. Timing of VPS Rate of Increase and Fee Update Recommendations

Commission Report on this date:	Report Recommends VPS increase for:	Report Recommends fee update for:	Fee Update Compares VPS set for:	with	change in expenditures:
May 1990	FY 1991				
May 1991	FY 1992	CY 1992	FY 1990		FY 1990 vs. FY 1989
May 1992	FY 1993	CY 1993	FY 1991		FY 1991 vs. FY 1990
May 1993	FY 1994	CY 1994	FY 1992		FY 1992 vs. FY 1991

Table 6. Growth in Total Allowed Charges by Type of Service ($ Millions)

Year	All	Physician	Surgical Type of Service	Other Type of Service
1983	$19,431	$17,606.0	$6,000.8	$11,605.2
1984	21,402	19,221.2	6,799.7	12,421.5
1985	23,705	20,994.3	7,522.0	13,472.3
1986	25,945	22,947.9	8,309.0	14,638.9
1987	30,050	26,604.3	9,478.4	17,125.9
1988	33,000	28,967.4	10,220.1	18,747.3
Annual Growth 83-88	11.2	10.5	11.2	10.1
Annual Growth 86-88	12.8	12.4	10.9	13.2

Source: PPRC analysis of HCFA data compendium (DHHS, 1989).

Note: Surgical and other type of service refer to the HCFA type of service definition, not to the VPS definition.

These figures are not per enrollee.

Dollar figures are in millions, growth rates are in percent per year.

Table 7. Growth in Allowed Charges, Prices, and Volume for Surgical and Nonsurgical Physician Services

	Allowed Charges, 1988* ($ Millions)	Annual Growth, 1986-1988		
		Charges	Prices	Volume
All Procedures	$15,628	12.6	2.5	9.9
Nonsurgical Procedures	11,286	13.6	3.0	10.3
Surgical Procedures	4,341	10.1	1.4	8.6
Difference in Volume Growth				1.7
Impact of No Growth Scenario for Cataract Surgery Volume:				
All Procedures	$15,428	11.9	2.5	9.2
Nonsurgical Procedures	11,269	13.5	3.0	10.2
Surgical Procedures	4,155	7.7	1.4	6.3
Difference in Volume Growth				3.9

Source: PPRC analysis of 1986 and 1988 BMAD-1 data.

*Charge amounts are for a subset of Part B carriers judged to have consistent data over the period 1986-1988 representing roughly 54 percent of 1988 allowed charges.

Note: Data are not on a per-enrollee basis.

The definitions of surgical and nonsurgical services approximately match the VPS definitions.

Table 8. Growth in Charges, Prices, and Volume for Groups of Procedures, 1986-1989

Procedure Group	Charges 1988 ($ Millions)	Percent of *All Charges	Percent of Surg. Charges	Percent of Nonsurg. Charges	Annual Growth Rate Charges	Annual Growth Rate Prices	Annual Growth Rate Volume
Other 90000 codes	$1,262	8	0	11	25	3	21
Cardiac Catheterization	246	2	0	2	23	4	18
Visits, Emergency	188	1	0	2	22	5	16
Consultations	563	4	0	5	14	4	10
Psychiatric Svcs	127	1	0	1	12	3	8
Visits, Office	1,813	12	0	16	12	5	7
ECG Except Monitoring	364	2	0	3	13	6	6
Visits, Other	142	1	0	1	13	7	6
Visits, Hospital	1,510	10	0	13	7	3	4
ECG, Monitoring to 24 hr	23	0	0	0	-46	8	-50
Arthroscopy	34	0	1	0	29	5	23
Surgery, Other Spinal	70	0	2	0	20	1	18
Heart Valve Repair/Replace	22	0	0	0	18	1	16
Joint Prosthesis	124	1	3	0	16	1	15
Surgery, Other	710	5	16	0	18	3	15
CABG	271	2	6	0	14	0	14
Endoscopy Exc. Transureth	532	3	3	4	16	3	13
Cataract Lens Implant	1,007	6	23	0	8	-3	11
Surgery, Other Cardiovasc	467	3	8	1	11	1	10
Surgery, Other Integument	507	3	5	3	13	3	9
Assistance at Surgery	222	1	5	0	7	0	7
Surgery, Other Respirator	82	1	2	0	9	3	6
Surgery, Other Musculoske	523	3	10	1	8	2	6
Surgery, Other Urinary	131	1	3	0	8	3	5
Transurethral Surg	225	1	5	0	7	2	5
Surgery, Digestive	425	3	9	0	6	2	4
MRI	82	1	0	1	104	-5	113
CAT Scans	329	2	0	3	20	5	15
Rad/Nuc Other Dx Rad	1,435	9	0	13	12	3	8
Anesthesia	598	4	0	5	5	0	5
Test, Auto Multichannel	132	1	0	1	6	-12	20
Tests, Other	31	0	0	0	15	6	9
Pathology, Surg/Aatomic	191	1	0	2	17	8	9
Local Codes	204	1	1	2	0	6	-5
All Other	1,040	7	0	9	23	0	22

Source: PPRC analysis of 1986 and 1988 BMAD-1 data.
*Charge amounts are for a subset of Part B carriers judged to have consistent data over the period 1986-1988, representing roughly 54 percent of 1988 allowed charges.

Note: Data are not on a per-enrollee basis.
The definitions of surgical and nonsurgical services approximately match the VPS definitions.

Table 9. Growth in Surgical/Nonsurgical Allowed Charges by Place of Service, 1986-1988

Place of Service	Allowed Charges* ($ Millions) 1986	1988	Percent Dist. of Charges 1988	Annual Growth 86-88
All Physician services:				
All	$12,322	$15,628	100	12.6
Office	3,966	5,274	34	15.3
Hospital IP	5,677	6,667	43	8.4
Hospital OP	2,001	2,779	18	17.9
All other	678	907	6	15.7
Nonsurgical services				
All	8,743	11,286	100	13.6
Office	3,661	4,858	43	15.2
Hospital IP	3,522	4,222	37	9.5
Hospital OP	898	1,306	12	20.6
All other	663	900	8	16.5
Surgical Services				
All	3,579	4,341	100	10.1
Office	306	415	10	16.6
Hospital IP	2,156	2,446	56	6.5
Hospital OP	1,102	1,473	34	15.6
All other	15	7	0	-32.7

Source: PPRC analysis of 1986 and 1988 BMAD-1 data.

*Charge amounts are for a subset of Part B carriers judged to have consistent data over the period 1986-1988, representing roughly 54 percent of 1988 allowed charges.

Note: Data are not on a per-enrollee basis.

The definitions of surgical and nonsurgical services approximately match the VPS definitions.

Table 10. Growth in Allowed Charges by Specialty, 1986-1988

Specialty	Allowed Charges, ($ Millions) 1986	1988	Percent of Total	Annual Growth Rate
All Physicians	$12,322	$15,628	100.0	12.6
Internal Medicine	1,989	2,455	15.7	11.1
Ophthalmology	1,432	1,915	12.3	15.6
GP/FP	1,145	1,368	8.8	9.3
Radiology	999	1,359	8.7	16.6
General Surgery	899	1,047	6.7	7.9
Cardiology	664	1,000	6.4	22.8
Group Practice	761	843	5.4	5.2
Orthopedic Surgery	618	764	4.9	11.2
Anesthesiology	539	626	4.0	7.8
Independent Lab	401	584	3.7	20.6
Thoracic Surgery	404	527	3.4	14.3
Urology	425	524	3.4	11.1
Gastroenterology	207	320	2.1	24.3
Dermatology	191	246	1.6	13.6
Podiatry	167	224	1.4	16.0
Pulmonary Disease	141	196	1.3	17.8
Neurology	143	189	1.2	14.9
Psychiatry	139	185	1.2	15.2
Pathology	128	179	1.1	18.6
Nephrology	114	164	1.1	19.8
Otolaryngology	123	153	1.0	11.8
Neurosurgery	117	141	0.9	10.1
OB/GYN	85	107	0.7	12.0
Chiropractic	72	87	0.6	9.8
Optometry	26	84	0.5	80.8
Plastic Surgery	55	71	0.5	13.5
All other	340	267	1.7	-11.3

Source: PPRC analysis of 1986 and 1988 BMAD-1 data.

*Charge amounts are for a subset of Part B carriers judged to have consistent data over the period 1986-1988, representing roughly 54 percent of 1988 allowed charges.

Note: Data are not on a per-enrollee basis.

Table 11. Case Mix Change for Visit Codes, 1986 to 1988

Type of Visit	Charges 1988* ($ Millions)	Annual Charge Growth Rate 1986-1988	Annual Charge Growth Rate Due To		
			Prices	Visit Mix	Volume
Visits, Office	$1,813	12.1	5.0	0.7	6.0
Visits, Hospital	1,510	6.9	2.9	0.4	3.4
Visits, Emergency	188	22.1	5.2	3.6	13.6
Visits, Other	142	13.1	6.9	0.3	5.6

Source: PPRC analysis of 1986 and 1988 BMAD-1 data.

*Charge amounts are for a subset of Part B carriers judged to have consistent data over the period 1986-1988, representing roughly 54 percent of 1988 allowed charges.

Note: Data are not on a per-enrollee basis.

Table 12: Comparison of Blue Cross/Blue Shield and Medicare Allowed Charges, 1987.

Ratio of Medicare to Blue Cross/Blue Shield allowed charge:	
Weighted Mean:	
All procedures	0.80
Surgical	0.85
Nonsurgical	0.77
Distribution of ratios:	
Across procedures:	
Maximum	0.93
Minimum	0.66
Standard Deviation	0.06
Across Plans:	
Maximum	1.08 *
Minimum	0.68
Standard Deviation	0.08

Source: PPRC analysis of 1987 BCBSA payment data.

Notes: *a) Data for this plan are 1988 data, deflated to 1987. This probably resulted in an understatement of Plan allowed charges.

b) Some Plans are Medicare carriers; others are not.

c) Global surgical service definitions may affect results.

d) Plan selective contracting with a limited network of providers may affect results.

e) Radiology and pathology procedures were excluded due to inconsistent reporting of profession and total components of fees.

f) Some outliers excluded due to inconsistent service definitions.

g) See text for more complete explanation of these Notes.

Table 13. Prevalence of Inappropriate Hospital Admissions

Population	Period	Percent Inappropriate
1132 adult non-Medicare admissions, 6 cities	*	40
4929 adult admissions 4 PSROs	*	19
1232 adult admissions, 4 PSROs	1980	19
2711 Medicare/Medicaid Admissions, Delmarva PSRO	1980-1981	14
197 adult admissions, 1 MA hospital	1981-1982	12
12071 adult admissions, 8 New England hospitals	1983-1984	12
2085 Medicare admissions, Delmarva PSRO	1982	10
467 Medicare discharges, 6 Maryland hospitals	1983	7
5732 adult admissions, nationally	1981	6
MEDIAN		**12**

Source: Compiled from Payne, 1987 and GAO, 1989.

Note: *Not reported.

Studies of care prior to 1980 are excluded from this table.

Table 14. Inappropriate Care for Selected Procedures

Procedure and Population	Period	Percent Inappropriate
PREOPERATIVE LAB SCREENING		
2000 patients in one site	1980-1981	60
CAROTID ENDARTERECTOMY		
1302 Medicare patients in thee areas.	1981	32
CORONARY ANGIOGRAPHY		
213 Medicare patients nationwide.	1987	20
CARDIAC PACEMAKER		
382 Medicare patients in Philadelphia county	1983	20
CORONARY ANGIOGRAPHY		
1677 Medicare patients in three areas.	1981	17
UPPER GI ENDOSCOPY		
1585 Medicare patients in 3 sites.	1981	17
CABG		
386 Medicare patients in three hospitals.	1979-1982	14
CAROTID ENDARTERECTOMY		
95 patients in 5 VA hospitals	1981	13

Source: Compiled from Brook et al., 1989, Leape, 1989, and GAO 1989.

Note: Studies of care prior to 1980 are excluded from this table.

Table 15. PRO Denial Rates by Procedure

	Percent Inappropriate
Not Substitutable to Outpatient Sites	
Pacemaker insertion	0.7
Cardiac Catheterization	1.6
Carotid Endarterectomy	1.8
Cholecystectomy	.0
CABG	.0
Hysterectomy	1.1
Major Joint Replacement	0.3
TURP	0.0
Potential Outpatient Procedures	
Breast Biopsy	4.3
Bunionectomy	9.8
Carpal Tunnel Release	11.5
Cataract and Lens Procedures	3.2
Dilation and Curretage	7.1
Endoscopies	4.5
Hernia Repair	6.7

Source: GAO, 1989.

Table 16. PRO and SuperPRO Denial Rates by State, 1986-1988

PRO	SuperPRO review of a sample of cases: Number of Sample Cases	Percent Denied by PRO	Percent Denied by SuperPRO
Alabama	1,144	2.5	10.5
Alaska	934	1.6	16.5
Arizona	1,140	1.7	10.2
Arkansas	1,160	4.6	10.9
California	1,192	1.1	6.8
Colorado	1,136	2.6	9.0
Connecticut	1,148	3.6	11.0
Delaware	942	2.8	12.6
D.C.	844	4.0	17.3
Florida	973	3.5	17.7
Georgia	1,135	3.0	13.0
Guam/Samoa	36	0.0	36.1
Hawaii	684	0.9	9.6
Idaho	668	0.4	8.1
Illinois	1,176	3.5	15.8
Indiana	1,164	2.4	8.7
Iowa	1,155	1.4	10.1
Kansas	1,089	3.3	13.5
Kentucky	1,142	2.5	10.9
Louisiana	1,147	2.6	13.1
Maine	1,092	1.8	11.2
Maryland	772	1.9	14.8
Massachusetts	721	3.5	11.4
Michigan	778	3.5	15.2
Minnesota	1,067	0.9	10.9
Mississippi	1,158	2.8	16.7
Missouri	1,173	3.1	12.8
Montana	1,015	0.7	17.8
Nebraska	1,087	5.1	15.1
Nevada	997	8.3	13.4
New York	1,101	1.9	10.1
New Jersey	1,166	1.4	9.3
New Mexico	945	1.2	12.7
New Hampshire	1,012	1.5	13.6
North Carolina	1,170	1.8	9.3
North Dakota	1,073	1.4	6.6
Ohio	790	1.5	12.4
Oklahoma	1,161	1.6	9.7
Oregon	1,128	3.5	10.7
Pennsylvania	785	3.3	11.7
Puerto Rico	729	1.9	14.5
Rhode Island	1,045	1.6	10.5
South Carolina	765	5.2	16.5
South Dakota	1,111	2.0	17.0
Tennessee	1,158	1.7	12.1
Texas	1,178	4.6	11.4
Utah	1,079	1.7	8.4
Vermont	1,045	1.1	12.2
Virgin Islands	159	8.8	28.3
Virginia	1,167	2.4	10.6
Washington	1,161	1.3	9.1
West Virginia	1,147	5.1	9.8
Wisconsin	1,129	3.7	14.4
Wyoming	869	0.7	17.3
National Aggregate	**53,942**	**2.6**	**12.1**

Source: GAO, 1989.

Note: Preadmission reviews not conducted.

Table 17. Carrier Denial Rates for Reason of Medical Necessity, 1989

Carrier	Total Submitted Charges, 1989 ($Millions)	Percent of Charges Denied for Reasons of Medical Necessity
National Aggregate	**$59549.42**	**2.1**
Alabama	897.89	1.5
Alaska	30.25	1.0
Arizona	838.31	1.5
Arkansas	536.36	2.1
California B/S	2801.29	2.1
CA-Occi (Non-P&E)	3935.15	2.6
CA-Occi (P&E)	217.40	5.6
Colorado	465.54	2.0
Connecticut	815.17	0.7
Delaware	144.05	2.5
District of Columbia	742.47	2.1
Florida	5369.14	1.7
Georgia-Aetna	950.87	2.9
Georgia-Prud	245.99	1.6
Hawaii	146.79	1.5
Idaho	114.95	1.7
Illinois	2241.91	2.6
Indiana	1031.97	1.6
Iowa	424.69	1.0
Kansas	354.42	3.4
Kentucky	725.18	1.6
LA-Arkansas	988.49	3.0
Maine	221.20	0.6
Maryland	773.95	0.4
Massachusetts	1627.71	0.8
Michigan	2361.94	2.1
Minnesota B/S	187.05	1.5
Minnesota-Trav	404.16	0.8
Mississippi	446.17	1.4
Missouri-Gen. Am.	795.75	1.4
Montana	120.19	1.5
MO-Kansas City	414.44	1.1
Nebraska	33.54	1.0
Neb-Kan	217.20	3.6
Nevada	273.04	1.4
New Hampshire	161.47	0.9
New Jersey	577.26	1.8
New Jersey-PA	1666.88	2.3
New Mexico	203.87	0.5
North Carolina	1106.95	1.5
North Dakota	140.19	1.1
NY-Binghamton	1071.63	1.1
NY-Empire	3666.11	1.6
NY-Group Health	453.65	3.9
Ohio	2514.99	6.4
Oklahoma	575.24	0.6
Oregon	418.23	0.9
Pennsylvania	3967.35	1.9
Pennsylvania-LAB	88.34	0.3
Puerto Rico	459.47	1.0
RBRB Travelers	1464.46	0.8
Rhode Island	286.07	1.6
SC B/S (Non-P&E)	503.44	4.4

Table 17. - Continued

SC B/S (P&E)	701.13	7.3
South Dakota	122.10	1.3
Tennessee	1027.18	1.6
Texas	3316.06	1.1
Utah	175.84	2.8
Vermont	77.07	0.8
Virgin Islands	1.82	0.6
Virginia	841.49	1.7
Washington	810.43	0.9
West Virginia	383.73	5.1
Wisconsin	833.50	2.1
Wyoming	38.86	1.7

Source: PPRC analysis of HCFA FY 1989 Carrier Workload Reports.

Note: P&E refers to national claims processing for parenteral and enteral nutrition supplies.

Table 18. Simulating Effects of Higher PRO/Carrier Denial Rates

	Carrier Denial Rate (Percent)	PRO Denial Rate (Percent
Actual	2.0	2.1
Additional percent of charges denied if all denial rates were at least as large as:		
50th percentile	+.2	+.3
75th percentile	+.5	+.9
90th percentile	+1.6	+1.6

Source: PPRC analysis of PRO and carrier denial rate data.

Table 19. Variations in Volume and Expenditure Per Capita Across States

State	Part B Volume Per Beneficiary Relative to U.S. Average	Part B Expenditures Per Beneficiary Relative to U.S. Average
California	1.24	1.50
District of Columbia	1.21	1.43
Florida	1.20	1.27
Colorado	1.15	0.94
Michigan	1.13	1.18
Nevada	1.06	1.24
Massachusetts	1.05	1.13
Arizona	1.04	1.08
Pennsylvania	1.03	1.10
Maryland	1.02	1.10
New Mexico	1.01	0.91
West Virginia	1.01	0.82
Ohio	1.00	0.88
Georgia	1.00	0.84
Utah	0.99	0.78
New York	0.98	1.18
Kansas	0.98	0.86
Illinois	0.97	0.93
Washington	0.97	0.94
New Jersey	0.97	1.03
New Hampshire	0.96	0.72
Texas	0.96	0.95
Missouri	0.96	0.79
Oregon	0.95	0.91
Mississippi	0.95	0.68
Rhode Island	0.95	1.02
Delaware	0.95	0.97
Arkansas	0.95	0.86
Minnesota	0.93	0.80
North Dakota	0.92	0.83
Alabama	0.92	0.75
Connecticut	0.91	0.97
Montana	0.91	0.78
Vermont	0.90	0.68
Virginia	0.90	0.78
Wyoming	0.90	0.77
Idaho	0.90	0.72
Tennessee	0.89	0.71
Iowa	0.86	0.69
Wisconsin	0.86	0.81
Indiana	0.86	0.74
Nebraska	0.85	0.65
Maine	0.84	0.73
North Carolina	0.83	0.69
South Dakota	0.80	0.64
South Carolina	0.80	0.61
Oklahoma	0.79	0.72
Louisiana	0.78	0.72
Kentucky	0.78	0.64

Source: PPRC analysis of Medicare AAPCC Master file.

Note: Alaska and Hawaii excluded. Average volume and expenditures for Part B services from 1981 through 1985.

Table 20. Impact of New Technologies on Volume Growth, 1986 to 1988

Type of Procedure	1988 Charges* ($Millions)	Annual Growth Rate, 1986-1988		
		Charges	Price	Volume
All procedures	$15,628	12.6	2.5	9.9
Excluding new technology	13,679	11.2	2.5	8.5
Nonsurgical Procedures	11,286	13.6	3.0	10.3
Excluding new technology	9,923	12.4	3.1	9.1
Surgical Procedures	4,341	10.1	1.4	8.6
Excluding new technology	3,756	8.0	1.1	6.8
New or diffusing technologies:				
Endoscopy Exc Laser, TURP	530.8	15.2	2.7	12.1
CAT Scans	329.7	20.2	4.6	14.9
Laser, Other	243.1	54.8	6.3	45.6
Ultrasound	202.4	10.4	-3.1	13.9
Joint Prosthesis	152.1	15.4	0.8	14.5
Doppler	115.8	39.0	2.9	35.2
MRI	82.1	103.6	-4.5	113.2
PTCA	74.6	45.4	3.6	40.4
Mammography	69.1	40.5	2.8	36.7
Arthroscopy	39.1	28.0	4.5	22.5
EEG	16.0	7.8	4.0	3.7
Electromyography	14.9	14.8	7.4	6.9
ESWL	14.0	37.1	4.5	31.2
Radioisotopes	13.0	12.2	6.7	5.2
Laser Endoscopy	12.7	49.8	6.1	41.2
Organ Transplant	10.9	2.2	4.5	-2.3
PVA, PTA	8.6	128.9	6.7	114.6
Urodynamic Studies	5.3	23.0	2.5	20.0
SPECT	3.9	-	-	-
Percutaneous Diskectomy	2.3	51.0	-2.2	54.4
Implant Infusion Pump	2.2	35.2	-2.6	38.8
Implant Defbril	1.5	1169.4	-2.7	1204.3
Myocardial Biopsy	1.3	30.4	-2.9	34.3
Xray Bsorpiometry	1.1	18.3	1.8	16.2
Pulse Oximetry	0.9	32.4	-5.4	40.0
Thrombolytic Therapy	0.5	244.9	-10.1	283.5
Flow Cytometry	0.4	457.7	7.2	420.3
Bone Growth Stimulator	0.1	47.1	-5.8	56.2
Cochlear Implant	0.1	171.4	19.8	126.4

Source: PPRC analysis of 1986 and 1988 BMAD-1 data.

*Charge amounts are for a subset of Part B carriers judged to have consistent data over the period 1986-1988 representing roughly 54 percent of 1988 allowed charges.

Note: Data are not on a per-enrollee basis.

The definitions of surgical and nonsurgical services approximately match the VPS definitions.

Table 21. Beneficiaries Over Age 75 as a Percent of Discharges for Major Surgery, 1985 to 1989

DRG Group	Discharges 1989	Percent of Discharges Represented by Elderly Over Age 75 1985	1989	Statistical Significance (t-test)
Total	1,708,477	48.7	48.0	-12.9
CABG	97,431	19.5	24.8	28.1
Major Circ System Procs	114,091	34.6	40.1	27.0
Back/Neck	52,419	28.6	31.3	9.8
Major Intestinal Proc	253,013	50.4	51.7	8.9
Major Kidney/Ut Proc	32,032	37.6	39.5	5.1
Prostatectomy	17,195	54.7	56.3	3.0
Hip/Femur Except Maj Joint	133,997	78.7	78.9	1.7
Craniotomy	28,723	44.4	45.0	1.6
Extracranial Vascular	45,690	38.0	38.4	1.3
Extensive Burn	388	54.9	59.0	1.2
Spinal Procs	3,623	34.5	35.7	1.0
Kidney Transplant	197	2.7	4.6	1.0
Pacemaker, No Ami	46,894	67.9	67.9	0.0
Major Head/Neck Procs	5,291	30.9	30.9	-0.0
Trauma	39,429	42.6	42.4	-0.5
Cholecystectomy	122,510	41.6	41.4	-1.0
Fx Fem/Pelvis	51,315	79.5	79.1	-1.2
Major Chest Procs	27,798	28.4	27.9	-1.4
TURP	202,933	47.2	46.8	-2.1
Major Proc for Lymph/Leuk	12,831	40.1	38.5	-2.6
Maj Fem Repro Procs	93,665	34.4	33.3	-5.0
Panc., Liver Procs	27,445	48.0	45.6	-5.5
Mastectomy	65,695	45.6	43.2	-8.7
Major Male Pelvic	18,510	35.5	28.9	-13.5
Major Joint	201,624	57.9	55.3	-16.8
Major Shoulder/Elbow	13,733	53.7	37.0	-28.1

Source: PPRC analysis of 1985 and 1989 MEDPAR data.

Note: 1985 proportions are adjusted for the faster growth of the over-75 population for the period 1985 through 1989.

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